

Remarks

1. In the present Office Action, the Examiner has withdrawn the objection to claim 2; the rejection of claims 1-21 under 35 U.S.C. §112, second paragraph; and the rejections under 35 U.S.C. §102(b) as anticipated by either Haruta et al. (EP 0 830928 B1) or Watanabe et al. (EP 0 831373 A2).

The Examiner also commented that claims 22-42 are withdrawn from further consideration pursuant to an election of claims made without traverse.

The present invention is drawn to a stereolithographic process for making three dimensional articles wherein the liquid radiation curable composition used in the stereolithographic process includes at least one filler comprising silica-type nanoparticles suspended in the liquid radiation curable composition. As explained on page 5 of the present specification, these resins containing silica-type nanoparticles have several advantages over other types of filled stereolithographic resins employed by prior art stereolithographic processes. These advantages include (1) they are optically transparent because of the small size of the particles and therefore do not scatter light, so that the resolution is the same as unfilled resins; (2) the nanoparticles don't form a sediment so the composition stays homogeneous and there is no need to add additional stirring equipment to the stereolithographic apparatus and (3) the viscosity of the nanoparticle filled resin composition is in the same range as for unfilled resins and recoating step can be performed as usual.

Stereolithographic processes are different than the three dimensional printing process described in the Napadensky et al. reference. A stereolithographic process typically involves a vat of liquid radiation-curable resin which portions of the upper surface is selectively exposed to a laser to harden those portions; then a new uncured resin layer is formed upon that partially cured layer (typically by lowering a platform thereby creating a new uncured layer of resin) and that new layer is then selectively cured with a laser so that a new thin solid layer is selectively formed upon the earlier layer. This process is repeated many times (sometimes up to 50,000 times) until a solid three-dimensional article is formed in the liquid resin vat (which still may contain uncured liquid resin wherein the laser did not expose the liquid resin). In contrast, three-

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dimensional printing employs at least one ink jet printing head to dispense one or more materials and then curing those layers.

It is noted that the cited reference employs nanoparticle fillers to overcome the disadvantages of using micron-size filler particles with ink jet application. See paragraph 127 and 128 of Napadensky et al. The problem of filler sedimentation in stereolithographic process is not a problem cited by the reference.

Claims 1-21 were rejected under 35 U.S.C. §102(e) as being anticipated by Napadensky et al (U.S. Patent Application Publication 2003/0207959 A1). This rejection is respectfully traversed.

In the present Final Rejection, the Examiner urges that Napadensky el al. does mention stereolithographic processes, citing paragraph 10 of the reference. However, this paragraph is directed to prior art stereolithographic processes and is not applicable to describing the operable disclosed inventive process of the reference. Again, the Examiner is respectfully requested to show exactly where the reference teaches the stereolithographic steps now claimed which employ the nanoparticle filler. In the absence of such a showing, the Examiner should withdraw this anticipation rejection.

The Examiner also attempts to define "stereolithography" so broad as to include three-dimensional printing. This is not correct. Three-dimensional printing and stereolithographic have evolved into separate and distinct product lines.

Furthermore, with respect to claim 21, the reference teaches away from the use of mixtures of micron-size and nano-size filler particles.

Claims 1-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Napadensky et al. (U.S. Patent Application Publication 2003/02007959 A1). These rejections are respectfully traversed.

With respect to this obviousness rejection, the Examiner makes exactly the same arguments he made with regard to the anticipation rejection above. Again, there is no specific teaching, suggestion or motivation stated in the cited reference which would lead the ordinary skilled artisan to use silica-type nanoparticle fillers in a stereolithographic resin composition. It is noted that the reference teaches the desirability of employing nanoparticle fillers only with regard to their advantages related to ink jet printer heads (which are not applicable to stereolithographic processes like that presently claimed).

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Again, as to the Examiner's argument that stereolithographic processes broadly include three-dimensional printing processes as disclosed by the reference, Applicants respond that the ordinary meaning of "stereolithography" has now evolved to mean something different than "three-dimensional printing".

An obviousness rejection must adequately articulate the motivation, suggestion or teaching that would have led the skilled artisan at the time of invention to combine prior art elements to make the claimed invention. Absent such an adequate explanation, the Federal Circuit has said "we infer that Board used hindsight to include the invention was obvious "*In re Kahn* (Fed Cir. No. 04-1616 3/22/06).

Such motivation to combine prior art references must be based on substantial evidence. *In re Lee* 277 F3d 1338, 61 USPQ 2d 1430 (Fed Cir. 2002) and *In re Ronflet*, 149 F.3d 1350, 47 USPQ 2d 1453 (Fed Circ. 1998). The Board cannot overstate the knowledge of one of skill in the art or employ improper hindsight in making it a *prima facie* case of obviousness.

Pursuant to currently recommended Patent Office practice, the Examiner is expressly authorized to call the Applicant's attorney collect at Valencia, California, if in his judgment disposition of this application could be expedited or if he considers the application not ready for examination or final disposition by other than allowance.

Respectfully submitted,
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